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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/606,752	06/27/2003	Yong Sung Ham	049128-5110	5560
30827 7590 07/25/2007 MCKENNA LONG & ALDRIDGE LLP 1900 K STREET, NW WASHINGTON, DC 20006			EXAMINER SHERMAN, STEPHEN G	
			ART UNIT 2629	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/606,752

Applicant(s)

HAM ET AL.

Examiner

Stephen G. Sherman

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-10 and 18-23 is/are allowed.
- 6) ☒ Claim(s) 11-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 November 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

1. This office action is in response to the amendment filed the 15 June 2007.

Claims 1-23 are pending.

### ***Response to Arguments***

2. Applicant's arguments filed the 15 June 2007 with respect to claims 11-17 have been fully considered but they are not persuasive.

On page 8, second paragraph of the applicant's response, the applicant argues that ARA does not teach of "comparing the reduced-bit source data of a current frame with reduced bit source data of a previous frame to modulate the source data by retrieving a stored preset modulated data in accordance....and a bit number of the stored preset modulated data is more than that of the reduced-bit source data of each of the previous frame and the current frame", however, the examiner did not use ARA to teach this feature, but instead used Morita to disclose of reducing source data.

On page 8, last paragraph of the applicant's response, the applicant argues that Morita does not teach ""comparing the reduced-bit source data of a current frame with reduced bit source data of a previous frame to modulate the source data by retrieving a stored preset modulated data in accordance....and a bit number of the stored preset modulated data is more than that of the reduced-bit source data of each of the previous frame and the current frame", however, the examiner did not use Morita to teach this

feature, but rather used Morita to teach “a bit converter for reducing the number of received source data to generate reduced bit data”, which the applicant agrees that Morita teaches.

On page 9, last paragraph of the applicant's response, the applicant argues that there is no teaching in Lee to retrieve an 8 bit value for a comparison wherein “a bit number of the stored preset modulated data is more than that of the reduced bit source data of each of the previous and current frame.” The examiner respectfully disagrees.

Lee discloses that the previous and current frames, each of 6-bits, are compared to teach other and that an 8-bit signal is output. This 8-bit output signal is the “modulated data” as explained in the rejection, which is the 6-bit generated number added to the 2-bit LSB. Lee does not need to teach of retrieving an 8 bit value for a comparison because the reference is not used to teach that feature. Lee was used to teach “wherein a bit number of a reduced-bit source data of a previous frame is the same as that of a current frame, and a bit number of modulated data is more than that of the reduced-bit source data of each previous frame and current frame”, where in combination with ARA and Morita, the claimed limitations are taught.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicants' APA (Specification paragraphs [0003]-[0018] and Figures 1-4), in view of Morita (US 2002/0196221) and further in view of Lee (US 2001/0038372).

***Regarding claim 11***, APA discloses an apparatus for driving a liquid crystal display, comprising:

an input line for receiving source data (Figure 4, Data in); and

a modulator for comparing the source data of a current frame with the source data of a previous frame to modulate the source data by retrieving a stored preset modulated data in accordance with a result of the comparison (Figure 4,  $F_n$  and  $F_{n-1}$  and page 5, paragraph [0010], 2<sup>nd</sup> sentence explains that the data is retrieved from a lookup table where it is stored.), and

wherein the modulator replaces all of the bits of the source data with the stored preset modulated data (As explained above, paragraph [0010], 2<sup>nd</sup> sentence explains that the data from the lookup table is used to replace the source data, therefore all of the bits are replaced with the stored value.).

APA fails to teach of a bit converter for reducing the number of bits of the received source data to generate reduced bit source data.

Morita discloses a bit converter for reducing the number of bits of the received source data to generate reduced bit source data (Page 2, paragraph [0023]).

Therefore it would have been obvious to “one of ordinary skill” in the art to combine the teachings of APA and Morita in order to create a liquid crystal display driving apparatus that would not cause deterioration in picture quality but would also reduce the memory of the lookup table.

APA and Morita fail to teach of a method for driving a liquid crystal display wherein a bit number of a reduced-bit source data of a previous frame is the same as that of a current frame, and a bit number of the stored preset modulated data is more than that of the reduced-bit source data of each previous frame and current frame.

Lee discloses a method for driving a liquid crystal display wherein a bit number of a reduced-bit source data of a previous frame is the same as that of a current frame, and a bit number of modulated data is more than that of the reduced-bit source data of each previous frame and current frame (Figure 11 and paragraphs [0096]-[0102]. The bit numbers of the previous and present frames are both equal to 6-bits, and the modified 8-bit signal which is outputted is more than the bit number of the reduced-bit previous and current frames.).

Therefore it would have been obvious to “one of ordinary skill” in the art at the time the invention was made to use the method taught by Lee with the method taught by the combination of APA and Morita in order to enhance the response speed of the liquid crystal by modifying the liquid crystal driving method without modifying the structure of the TFT-LCD.

***Regarding claim 12***, APA, Morita and Lee disclose the apparatus of claim 11.

Morita also discloses wherein the selected modulated data is set to be a minimum value within a data band that includes a plurality of initial modulated data, and each of the initial modulated data is larger than a current data value of the current frame, when the current data value of the current frame is larger than a previous data value of the previous frame (Page 2, paragraph [0031]. The examiner interprets the lookup table of consisting of initial modulated data and that a value larger than the current data value (first input data) could be chosen from this table when the current data is larger than the previous data (second input data) and that in selecting this data,

since overshooting is being performed, that it would be logical for the value in the data band that would be selected would be the minimum value because all of the values are larger than that of the current value and the next highest number would be the minimum. ).

Therefore it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to combine the teachings of APA, Morita and Lee in order to allow for the optimization of display characteristics.

***Regarding claim 13***, APA, Morita and Lee disclose the apparatus of claim 11.

Morita also discloses wherein the selected modulated data is set to be a maximum value within a data band that includes a plurality of initial modulated data, and each of the initial modulated data is smaller than a current data value of the current frame, when the current data value of the current frame is smaller than a previous data value of the previous frame (Page 2, paragraph [0031]. The examiner interprets the lookup table of consisting of initial modulated data and that a value smaller than the current data value (first input data) could be chosen from this table when the current data is smaller than the previous data (second input data) and that in selecting this data, since overshooting is being performed, that it would be logical for the value in the data band that would be selected would be the maximum value because all of the values are smaller than that of the current value and the next lowest number would be the maximum. ).



Therefore it would have been obvious to “one of ordinary skill” in the art at the time the invention was made to combine the teachings of APA, Morita and Lee in order to allow for the optimization of display characteristics.

***Regarding claim 14***, APA, Morita and Lee disclose the apparatus of claim 11.

Morita also discloses wherein the source data is modulated to the current data value of the current frame, when the current data value of the current frame is the same as a previous data value of the previous frame (Page 1, paragraph [0012] where it states: “That is, the lookup table 103 is set a value, in advance, so that, when a gray-scale value of an input 1 is equal to a gray-scale of an input 2, the gray-scale value is output as an output 2...” The examiner interprets input 1 and 2 to be the current and previous frame data and that when these values are equal the lookup table is bypassed.).

Therefore it would have been obvious to “one of ordinary skill” in the art at the time the invention was made to combine the teachings of APA, Morita and Lee in order to allow the display to maintain the current settings when no change has been detected within the system.

***Regarding claim 15***, APA, Morita and Lee disclose the apparatus of claim 11.

Morita also disclose wherein the modulator includes: a frame memory for delaying the reduced-bit source data for one frame interval (Figure 1, item 3 and page 2, paragraph [0023]); and a lookup table for comparing the reduced-bit source data of

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the previous frame with the reduced-bit source data of the current frame to select a preset modulated data in accordance with the result of the comparison (Figure 1, item 4 and page 2, paragraph [0024]).

Therefore it would have been obvious to “one of ordinary skill” in the art at the time the invention was made to combine the teachings of APA, Morita and Lee in order to allow for a driving apparatus that could compare a previous and current frame and make an adjustment accordingly.

***Regarding claim 16***, APA, Morita and Lee disclose the apparatus for driving according to claim 15.

Morita also discloses wherein the bit converter is connected between the frame memory and an input terminal of the lookup table (Figure 1, items 1, 3 and 4 where items 1 and 2 make up the bit converter in which item 2 is connected to item 3, the frame memory, and item 2 is also connected to an input terminal of item 4, the lookup table. Since the controller, item 2, is in combination with item 1 to make the bit converter, the bit converter is therefore between items 3 and 4, the frame memory and lookup table.).

Therefore it would have been obvious to “one of ordinary skill” in the art at the time the invention was made to combine the teachings of APA, Morita and Lee in order to allow for the source data to be reduced before it is stored in memory so that it will take up less memory space.

**Regarding claim 17**, APA, Morita and Lee disclose the apparatus for driving according to claim 11.

APA, Morita and Lee fail to disclose wherein the source data is an 8-bit data, and the reduced-bit source data is a 7-bit data.

However, it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to make the source data 8 bits and the reduced source data 7 bits in order to save memory space by allowing for a smaller lookup table.

***Allowable Subject Matter***

6. Claims 1-10 and 18-23 are allowable.

7. The following is a statement of reasons for the indication of allowable subject matter:

**Regarding claim 1**, the primary reason for indicating claim 1 allowable is the inclusion into the existing claim language of the limitation of reducing the number of bits includes converting an odd source data value into an even source data value having the same number of bits as the odd source data, and then reducing the number of bits of the converted even source data, which is not found singularly or in combination within the prior art.

**Regarding claim 7**, the primary reason for indicating claim 7 allowable is the inclusion into the existing claim language of the limitation of n-k bits corresponding to the most significant of the n bits and the inclusion of the limitation of replacing all of the bits within the n bit source data with the n bit modulated data in combination with the claim previously reciting of setting a first and second n bit modulated data, which is not found singularly or in combination within the prior art.

**Regarding claim 18**, the primary reason for indicating claim 18 allowable is the inclusion in the existing claim language of the limitation of replacing all of the bits within the n bit source data with the n bit modulated data in combination with the claim previously reciting of registering a first and second n bit modulated data, which is not found singularly or in combination within the prior art.

### ***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen G. Sherman whose telephone number is (571) 272-2941. The examiner can normally be reached on M-F, 8:00 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SS

16 July 2007

AMR A. AWAD  
SUPERVISORY PATENT EXAMINER

A handwritten signature in black ink, appearing to read "Amr A. Awad", with a stylized flourish at the end.